Antennal segments	1	2	3	4	5	6	7	8
Width (microns)	51	42	36	39	36	33	30	22
Length (microns)	60	84	210	169	141	99	69	64

Total length of antenna, 0.86 mm.*

Described from one female taken by Dr. Alex Wetmore of the United States Biological Survey at Punta Gorda, Florida, February 3, 1919, in miscellaneous sweepings.

Readily separable from the North American species of the genus by the long head, the notched frontal costa, and the short, stout tube. The subequal width of prothorax, pterothorax, and abdomen makes the species readily recognizable to the naked eye.

Notes on Dragonflies (Odonata) from Lee County, Georgia, with a Description of Enallagma dubium, new species.

By Francis Metcalf Root, Department of Medical Zoology, School of Hygiene and Public Health, the Johns Hopkins University, Baltimore, Maryland.

During the summer of 1923, while working under Dr. S. T. Darling at the malaria research station maintained by the International Health Board at Leesburg, Georgia, I collected a number of specimens of Odonata in spare moments. This collection contains enough interesting material to be worthy of record, although in the Anisoptera, especially, only a small fraction of the entire fauna is represented.

Lee County is in the southwestern part of the state of Georgia, approximately one hundred miles from the Gulf Coast and one hundred and fifty miles from the Atlantic Coast. Despite this inland location, the Odonate fauna includes several species which, farther north at least, are usually considered sea-coast forms. *Ischnura ramburii,* for example, here replaces *I. verticalis,* and *Libellula auripennis* and *Celithemis ornata* are frequent. The same thing is evident in the mosquito fauna.

*The length of the antenna as given here is appreciably less than the total to be gotten by adding together the measurements given for the individual segments, because of the oblique truncation of the subapical segments.

In spring and fall, if not also in summer, *Anopheles crucians* is the commonest Anopheline of the county. This species, farther north, is usually a salt-marsh breeder.

Surface water is very abundant in Lee County. The underlying formation is limestone, and both deep and shallow "lime sinks," all holding more or less water, are a conspicuous feature of the topography. Appearing and disappearing streams, which bubble up as springs from some lime sink, flow rapidly for distances varying from a few feet to several miles, and then sometimes vanish below the surface again, are common. Two large creeks, the Kinchafoonee and the Muckalee, flow through the county and have various small "branches" as tributaries. Collections of standing water, collectively known as "ponds" to the inhabitants, are also abundant. This designation includes a great variety of water collections, such as large permanent ponds full of water-lilies and lotus; permanent cypress and gum swamps, semi-permanent wooded ponds and swamps which dry out almost or quite completely in the dryest weather, cattail swamps formed by obstructions in small streams or old ditch systems, and a great variety of rain-ponds of all sizes, both in woods and in open fields, which are filled with water in spring and early summer, but are usually dry in late summer. Nearly every plantation includes several ponds of one sort or another, and some owners declare that more than half of their places is under water most of the summer.

The species of Odonata taken during my stay in Leesburg (June 20 to Sept. 15) are listed below. My thanks are due to Dr. P. P. Calvert and Dr. E. M. Walker for generous assistance in identifying some of the more difficult specimens.

As a note of interest to collectors, I might add that my only specimens of several species of high- and swift-flying Anisoptera were caught by hand after they had been more or less stunned by flying into the Ford car in which we visited the outlying plantations.

AGRION MACULATUM Beauvais—Fairly common all summer along small streams.

LESTES FORCIPATUS Rambur—Common all summer, especially about the semi-permanent wooded ponds.

LESTES RECTANGULARIS Say—Three males, Hodge's plantation, Aug. 3.

LESTES VIGILAX Hagen—Common about large ponds, July 25-Sept. 4.

ARGIA APICALIS Say—Common along bank of Kinchafoonee Creek near Newsome's plantation, July 12.

ARGIA BIPUNCTULATA Hagen—Two males, Smith's plantation, Sept. 5.

ARGIA FUMIPENNIS Burmeister—Common along small streams and ditches during entire summer.

ARGIA MOESTA PUTRIDA Hagen—Common all summer along Kinchafoonee Creek near Leesburg.

ARGIA SEDULA Hagen—Common along bank of Kinchafoonee Creek near Newsome's plantation, July 12.

ARGIA TIBIALIS Rambur—Taken along small rapid streams. Two males, Stock's plantation, July 6; two males, Bagley's plantation, July 25.

ENALLAGMA DOUBLEDAYI Selys—One of the commonest damselflies of the region. Found throughout the summer in large numbers at nearly all permanent and semi-permanent ponds and swamps.

ENALLAGMA DUBIUM new species—One male from a small lily-pond enclosed by cypress, Scrutchen's plantation, Aug. 24.

ENALLAGMA GEMINATUM Kellicott—Not very common, found mostly at small lily-ponds. One male, Smith's plantation, July 13; one male, Pruitt's plantation, July 26; two males, Scrutchen's plantation, Aug. 24.

ENALLAGMA SIGNATUM Hagen—Common at a single semi-permanent pond on Smith's plantation, Aug. 14.

TELAGRION DAECKII Calvert—One male, June 29; one male, July 10; both in cypress swamps.

NEHALENNIA INTEGRICOLLIS Calvert—Three pairs in copula taken and many others seen along the edges of a cypress swamp on Price's plantation, Aug. 22.

ISCHNURA POSITA Hagen—Two males from small stream near Starkville, June 21.

ISCHNURA PROGNATA Hagen—One male, July 10; one male, Aug. 3; both in cypress swamps.

ISCHNURA RAMBURII Selys—Not uncommon about the larger ponds during the entire summer.

ANOMALAGRION HASTATUM Say—The commonest and most widely distributed damselfly of the region. Found about all kinds of ponds, swamps, ditches, etc., throughout the summer.

GOMPHUS sp?—Two males of a large yellow *Gomphus* which

Dr. Calvert pronounced to be near *G. plagiatus,* but probably distinct, were taken in a brushy pasture on Smith's plantation, Sept. 3.

ANAX JUNIUS Drury—Fairly common all summer about the larger ponds.

ANAX LONGIPES Hagen—One male taken at a large pond on Walker Paul's plantation, July 3.

CORYPHAESCHNA INGENS Rambur—One female caught in Ford car, July 10.

MACROMIA TAENIOLATA Rambur—Seen often, throughout the summer, flying along the roads near Muckalee Creek. One female, Aug. 15 and one male, Sept. 1, both caught after flying into Ford car in this region.

EPICORDULIA PRINCEPS Hagen—Not rare about the larger ponds.

SOMATOCHLORA LINEARIS Hagen—One male caught along edge of a strip of woodland fringing a cypress swamp near Folltown, July 12.

SOMATOCHLORA PROVOCANS Calvert—One female, July 7, caught when it flew into Ford car. According to Dr. Walker, this is the first female of this species to be recorded.

SOMATOCHLORA sp?, near TENEBROSA Say—One female, July 6, caught when it flew into Ford car. The foregoing three specimens of *Somatochlora* were kindly determined for me by Dr. E. M. Walker.

LIBELLULA AURIPENNIS Burmeister—Not uncommon about the larger ponds.

LIBELLULA AXILLENA Westwood—Common, especially about wooded ponds.

LIBELLULA CYANEA Fabricius—One male, Smith's plantation, July 7.

LIBELLULA INCESTA Hagen—Common, especially about wooded ponds.

LIBELLULA PULCHELLA Drury—This species, so common farther north, was not seen at all until one female was taken near Leesburg on July 26. Later several other specimens were seen at the same pond, but the species never became common.

LIBELLULA SEMIFASCIATA Burmeister—One female, Smith's plantation, July 7.

LIBELLULA VIBRANS Fabricius—Common, especially about wooded ponds.

PLATHEMIS LYDIA Drury—Common all summer about small sunny ponds.

PERITHEMIS DOMITIA Drury—Common all summer about the larger ponds.

ERYTHRODIPLAX MINUSCULA Rambur—Common all summer about semi-permanent ponds.

ERYTHEMIS SIMPLICICOLLIS Say—Common all summer about ponds.

SYMPETRUM AMBIGUUM Rambur—Two males, Heath's plantation, July 6.

PACHYDIPLAX LONGIPENNIS Burmeister—The commonest dragonfly of the region. Especially numerous about wooded ponds.

CELITHEMIS ELISA Hagen—Teneral specimens very numerous about several ponds on Walker Paul's plantation, July 12.

CELITHEMIS EPONINA Drury—Not uncommon about certain large ponds on Smith's plantation at all visits.

CELITHEMIS ORNATA Rambur—Although this species was common, the only specimens brought back were some taken at a large grassy pond on Usry's plantation on Aug. 6. Two of these specimens are typical *ornata*. In the other two the markings at the base of the hind wing are considerably reduced, in one only a narrow black band being left. The wings of this particular specimen really look more like a *Leucorhinia* than a *Celithemis*. Since the fourth specimen is more or less intermediate between this condition and the typical *ornata*, it seems best to record them all under that species. A more extensive series would be required to decide whether these two aberrant specimens are extreme variants of *ornata* or something new.

PANTALA FLAVESCENS Fabricius—Common, but flies high and is hard to catch. Specimens taken July 18, Aug. 6, Aug. 10, Sept. 3.

PANTALA HYMENEA Say—Occurs with the preceding species, but not quite so commonly. Specimens taken, July 2, July 18.

TRAMEA CAROLINA Linne—Common, but flies high, as a rule. Specimens taken, June 29, July 12, July 23, July 26, Sept. 1.

Enallagma dubium, new species.

On Aug. 24, while collecting at a small lily-pond completely surrounded by cypress swamp, just across the road from the plantation house at Scrutchen's, I saw a small red-and-black damselfly resting on a lily-pad beside a male of *E. geminatum*. A sweep of the net captured the male *geminatum*, but not the other damselfly. A few minutes later the same individual, in all probability, was accidentally caught, without being seen, while I was striking at another *geminatum*.

As soon as it was removed from the net, this damselfly attracted my attention because of the brilliant, metallic, coppery-red color of its pale markings. In alcohol, this has since faded to an orange-yellow. It is a male *Enallagma*, and the appendages show that it belongs in the same group with *signatum*, *vesperum* and allied forms. Its closest allies would seem to be *pictum* Morse and *concisum* Williamson, with which it shares the peculiarity of having the entire dorsum of the abdomen black, except for very narrow intersegmental rings. The outline of the superior appendages in profile view, superficially at least, resembles that of *signatum* more than it resembles either *pictum* or *concisum*. The color pattern is of the same general type as that of *pictum* and *concisum*, as given in the descriptions of Calvert and of Williamson, but the pale markings are rather more restricted. The pale band of the anterior surface of the frons is less extensive, the two basal joints of the antennae are black, there are no pale spots about the ocelli, the middle lobe of the prothorax is all black dorsally, the pale antehumeral stripe of the thorax is narrower than in the other species, and the dorsal black of the tenth abdominal segment extends farther down the sides than is indicated in the drawings of the other species.

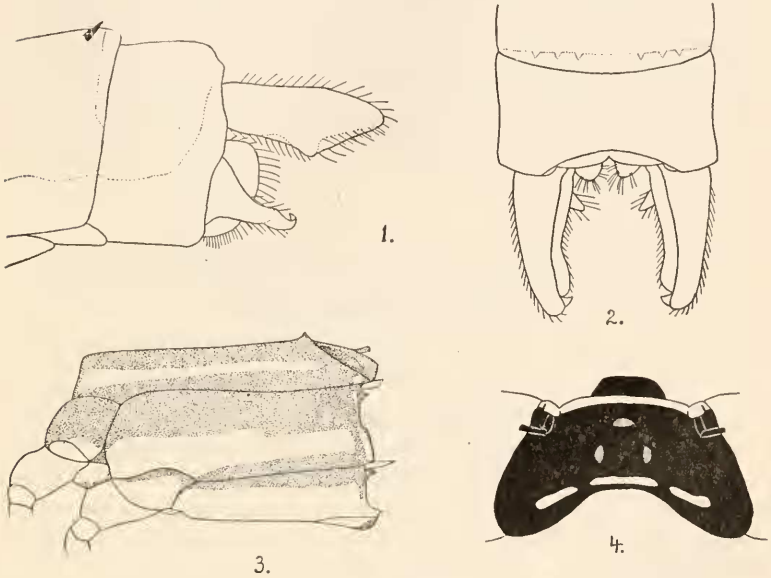
In view of these differences, it seems best to describe this specimen as a new species. I propose for it the name of *E. dubium*, in recognition both of the doubtful advisability of basing a new species on a single specimen and of the possibility that further study may indicate that *pictum*, *concisum* and *dubium* are all varieties of a single species.

Dr. Calvert has examined the specimen and believes it to be distinct from both *pictum* and *concisum*. I have requested him to deposit the single male type in the collection of the Philadelphia Academy of Natural Sciences.

♂. (Text figs. 1-4) Superior appendages in profile view with the apical margin only slightly shorter than the inferior margin, oblique, nearly straight, and not bilobed, but with the inferior apical angle slightly projecting; in dorsal view the intero-inferior lamella reaches the level, or nearly to the level, of the supero-internal, sub-apical hook. Nasus black. Frons:

pale color of the anterior surface reaching the level of and including the semi-detached sclerites which bear the antennae. Two basal joints of antennae black. No pale markings about ocelli. Pale postocular spots linear cuneiform, broadly separated by black from the pale color of the rear of the head below and narrowly separated from the pale line of the vertex.

Prothorax mainly black dorsally; a transverse orange bar anteriorly on anterior lobe, small indistinct orange spots laterally on posterior lobe, middle lobe without pale markings except for



Figures 1–4.—*Enallagma dubium* n. sp.
Figures 1 and 2.—Male appendages in lateral and dorsal views.
Figure 3.—Color pattern of thorax in lateral view.
Figure 4.—Color pattern of head in dorsal view.

the sides, which are yellow inferiorly. Width of black mid-dorsal thoracic stripe .62 mm., of pale antehumeral .1 mm. through most of its length, widening abruptly to about .2 mm. at anterior end, of black humeral about .49 mm. Second lateral thoracic suture with a black stripe its entire length, gradually widening posteriorly and with slight dorsal and ventral prolongations along the posterior margin.

Abdomen all black dorsally, except for narrow apical (1, 7-9) or basal (3-7) segmental orange rings. Sides and venter of abdomen orange to yellowish, with an indistinct mid-ventral dark stripe.

Wings hyaline, pterostigma light brown, border darker, surmounting less than one cell. Arculus slightly distad to second antecubital, limbs of arculus sub-equal. Upper side of quadrilateral about one third of lower side in front wing, one half of lower side in hind wing. Inferior sector of triangle arises in front of submedian crossvein (at a distance greater than the length of the crossvein) and ends at about the level of origin of the nodal sector. The superior sector of triangle ends between levels of origin of nodal and ultra-nodal sectors. Submedian crossvein between first and second antecubitals, slightly nearer to second. Fore wings with about eight postcubitals, hind wings with about seven. Nodal sector arises nearest fourth postcubital in both hind wings and one fore wing, nearest fifth in other fore wing. Ultra-nodal sector arises one cell proximal to inner brace vein of pterostigma in fore wings, and slightly distal to inner brace vein in hind wings. Three antenodal cells in both wings. Dimensions: Abdomen 20 mm., hind wing 12 mm.

On the Biology of Curicta drakei Hungerford (Heteroptera, Nepidae).*

By Grace Olive Wiley, St. Paul, Minnesota.

(Plate X.)

The summer of 1922 was spent by the writer in Colorado County, Texas, where insects were collected, principally. Here were obtained a number of specimens of *Curicta drakei,* of the family Nepidae, a species only recently described by Dr. H. B. Hungerford. A sharp lookout had been kept for specimens belonging to this particular genus, since it was known that a specimen of *Curicta howardi* Montandon had been found at Victoria, Texas, about sixty miles distant.

Late in June two nymphs were found clinging to vegetation, along the bank of a large creek where the water was deep. A few days later this place was again visited and a thorough search made in the same pool, which proved fruitless. Skull creek was a good-sized stream, but during the summer the water was only running in places and was reduced to pools, some quite long and deep while others were small and shallow. It

*Contribution from the Department of Entomology, University of Minnesota.